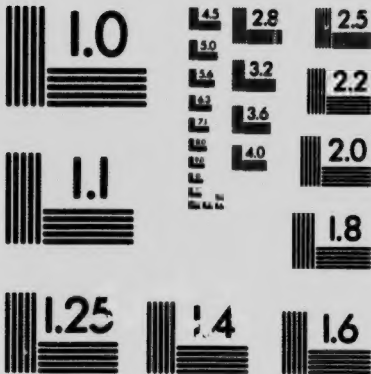


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**DAIRY AND COLD STORAGE COMMISSIONER'S BRANCH**  
**OTTAWA, CANADA**

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# **The Progress of Cow Testing**

By  
**A. H. WHITE**  
Senior Dairy Promoter



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# THE PROGRESS OF COW TESTING

BY A. H. WHITE.

*Senior Dairy Promoter.*

## DETAILS OF ORGANIZATION.

Since May, 1918, the cow testing work has been carried on under a different plan than formerly. Previous to that year, the Dairy Branch had established thirty-five dairy record centres situated in six provinces with most of the work done in Ontario and Quebec. But there were so many insistent requests for assistance from outside points, that a change had to be made to meet these demands.

The present plan was adopted to give help to every farmer no matter where he is situated, and the work has spread through all the Prairie Provinces and in sections of the other provinces which were not touched by the dairy record centres.

Under the new organization the Dairy Branch employs a trained dairy expert to supervise the work in each province, except British Columbia. The duties of the supervisors consist in organizing cow-testing centres or associations, keeping in touch with the men who do the testing, speaking at meetings on any subject related to dairying, and to generally spread propaganda about cow testing and better methods of dairying. Furthermore, the Dairy Branch supplies all blank record forms, preservative tablets and sulphuric acid free of cost and pays ten cents per sample to any cheese or buttermaker, or any one else who is willing and qualified to do the testing for the farmers in their locality. The farmers provide their own sample bottles, scales and dipper. They weigh and sample the milk of each cow twice a day on three days a month, and forward the composite samples promptly to the testing point at the end of each month.

After the testing is done, the record forms of each farmer are sent to the Dairy Commissioner's office at Ottawa by the tester, where the figures are extended, showing calculated monthly production of milk and fat for each cow. The original sheets are then returned direct to the farmer, so that within a few days of the last weighing, the owner of each herd knows what each cow has produced for the previous month.

This scheme requires full co-operation on the part of the tester and the farmer. Each must do his share of the work carefully and promptly to keep up the interest so that the greatest good can be obtained. Where both tester and farmer are interested a great deal of good can be accomplished in the locality.

## OBJECT OF COW TESTING.

The object of the work is to give the dairyman accurate knowledge as to the production of milk and fat of each cow in the herd. It is readily admitted that the average dairy cow does not produce as much milk as she is capable of giving and it is an admitted fact that many dairymen keep one or more cows which do not even pay for their keep. Cow testing shows what cows are worth keeping in the herd and shows which ones should be eliminated at the first

possible opportunity. Many farmers rely on guesswork to pick out their best cows from which to save heifer calves for the future herd, but many times they are not correct, and cows which have good conformation are not always the best producers in the herd. Dairy records will do away with any guesswork and the farmer can select with reliability his best cows for breeding purposes. Thus will herd improvement be brought about, which is the aim in all cow-testing work.

Dairy records will give the dairyman knowledge which will lead to better feeding methods. Every cow has a distinct individuality. Some cows will respond to better feeding much more readily than will others. With the records of each cow at hand, the herdsman can pick out the likely cows. He is able to feed with more discrimination, apportioning the grain ration according to the production of milk and fat. The cows that will respond to liberal feeding will pay handsome profits for the extra feed given. Cow testing will show these facts to the observant dairyman.

Cow testing will also show that it pays to take good care of the milch cows. Plenty of good clean water, abundance of light and fresh air and comfortable, sanitary quarters are all conducive to the highest production. One farmer in Alberta increased his production thirty per cent in one month by protecting the cows from extremely cold weather by watering them in the barn. Where records of each cow are regularly kept, these things will be brought to notice.

#### SOME RESULTS.

Wherever cow testing has been followed for a few years, there will be found a decided increase in the average production of each cow. Farmers realize the value of better and a more liberal food supply, and build silos; they realize the value of better care and management and build sanitary, well lighted and well ventilated barns; and they have the value of the pure-bred dairy sire so forcibly pointed out to them, that the increase in the use of pure-bred bulls is very noticeable in districts where cow testing is followed regularly.

Many farmers have increased the production of their herds from thirty to seventy-five per cent and some have even doubled the herd average in a few years. Many letters are received in this office from farmers saying they cannot afford to be without dairy records. One farmer on the prairies said he was able to build a seven thousand dollar dairy barn through cow testing and the results obtained from the work.

Better methods of feeding and breeding, more interest in the work of the farm to all concerned, and increased production with resulting increases in value of the stock, are all due in a large measure to cow testing.

The following tables will show what has been done by the Dairy Branch in cow testing during the year of 1919. These figures, however, only partially represent the farmers who are testing their cows, for the branch supplies free, many record forms to farmers who do their own testing and thus no record of these herds are received at the office. But it is encouraging to know that farmers generally are becoming interested in this work, and are realizing that to obtain the best results from their herds, whether they be pure-bred, grade or scrub, they must have accurate information as to the production of each cow, which can only be obtained by regular and consistent use of the scales and Babcock test.

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TABLE No. I.

TOTAL NUMBER OF HERDS, COWS, TESTING CENTRES AND BARCOCK TESTS MADE BY PROVINCES, 1919.

| Province.                 | Herds. | Cows.  | Testing Centres. | Samples Tested. |
|---------------------------|--------|--------|------------------|-----------------|
| Alberta.....              | 64     | 820    | 26               | 2,539           |
| British Columbia.....     | 34     | 215    | 5                | 1,235           |
| Manitoba.....             | 83     | 1,035  | 22               | 3,793           |
| New Brunswick.....        | 250    | 1,065  | 18               | 5,144           |
| Nova Scotia.....          | 207    | 2,714  | 37               | 12,623          |
| Ontario.....              | 417    | 4,214  | 70               | 18,204          |
| Prince Edward Island..... | 241    | 1,307  | 17               | 5,907           |
| Quebec.....               | 1,046  | 10,374 | 137              | 42,428          |
| Saskatchewan.....         | 74     | 773    | 16               | 2,912           |
| Totals.....               | 2,416  | 22,517 | 348              | 94,585          |

It is very gratifying to note that in the prairie provinces the total number of cows recorded in 1919 was nearly twice as many as were recorded in 1918.

TABLE No. II.

TOTAL NUMBER OF COWS IN EACH PROVINCE AND TOTAL NUMBER OF COWS RECORDED.

| Province.                 | Total Cows. | Number of Cows Recorded. | Percentage of Cows Recorded. |
|---------------------------|-------------|--------------------------|------------------------------|
| Alberta.....              | 336,596     | 820                      | 0.24                         |
| British Columbia.....     | 51,594      | 215                      | 0.40                         |
| Manitoba.....             | 227,872     | 1,035                    | 0.45                         |
| New Brunswick.....        | 153,058     | 1,065                    | 0.69                         |
| Nova Scotia.....          | 162,230     | 2,714                    | 1.60                         |
| Ontario.....              | 1,140,016   | 4,214                    | 0.37                         |
| Prince Edward Island..... | 45,662      | 1,307                    | 2.80                         |
| Quebec.....               | 1,056,347   | 10,374                   | 0.98                         |
| Saskatchewan.....         | 374,062     | 773                      | 0.21                         |
| Total.....                | 3,547,437   | 22,517                   | 0.63                         |

This table does not show all the testing that is done, but only the records received by the Dairy Branch. There are many men who keep records of individual cows but do not send the records to this office.

But it shows also what a very small percentage of the total cows are tested regularly. However, the practice is growing every year because the farmers are seeing results from the work which has been undertaken in their locality.

It will be noticed that Nova Scotia has the second highest percentage of cows under test. This will explain to a great extent why that province stands so low in the general average table. The greater the percentage of cows under test, the greater will be the percentage of poorer herds recorded.

TABLE No. III.

NUMBER OF HERDS AND COWS AND AVERAGE PRODUCTION FOR FULL LACTATION PERIODS BY PROVINCES

| Province.                 | Number of Herds. | Number of Cows. | Average Production. |       |       |
|---------------------------|------------------|-----------------|---------------------|-------|-------|
|                           |                  |                 | Milk.               | Test. | Fat.  |
|                           |                  |                 | Lb.                 |       | Lb.   |
| Alberta.....              | 12               | 83              | 5,198               | 3.6   | 190.7 |
| British Columbia.....     | 12               | 84              | 6,669               | 3.9   | 262.8 |
| Manitoba.....             | 11               | 98              | 5,177               | 3.4   | 183.4 |
| New Brunswick.....        | 25               | 154             | 5,857               | 4.0   | 235.6 |
| Nova Scotia.....          | 83               | 416             | 4,962               | 3.9   | 195.5 |
| Ontario.....              | 67               | 535             | 6,725               | 3.6   | 243.0 |
| Prince Edward Island..... | 63               | 300             | 6,586               | 3.7   | 243.4 |
| Quebec.....               | 116              | 1,048           | 4,798               | 3.8   | 182.8 |
| Saskatchewan.....         | 8                | 44              | 4,944               | 3.9   | 192.9 |
| Totals and averages.....  | 397              | 2,732           | 5,522               | 3.7   | 207.  |

As in previous years, there were a great many farmers who only kept records for a few months of the year. This was especially noticeable where the testing was done at factories which were only open for the summer season.

Records for only two or three months will not give a very good basis from which to calculate the production of a cow. In order to know, records should be kept for the full lactation period and from one year to another.

TABLE No. IV.

COMPARISON OF AVERAGE PRODUCTION BY PROVINCES FOR YEARS 1915, 1916 AND 1919.

| Province.                 | Average Production. |       |       |       |       |       |
|---------------------------|---------------------|-------|-------|-------|-------|-------|
|                           | 1915.               |       | 1916. |       | 1919. |       |
|                           | Milk.               | Fat.  | Milk. | Fat.  | Milk. | Fat.  |
|                           | Lb.                 | Lb.   | Lb.   | Lb.   | Lb.   | Lb.   |
| Alberta.....              |                     |       |       |       | 5,198 | 190.7 |
| British Columbia.....     |                     |       |       |       | 6,669 | 262.8 |
| Manitoba.....             |                     |       |       |       | 5,177 | 183.4 |
| New Brunswick.....        | 4,558               | 183.3 | 4,486 | 181.8 | 5,857 | 235.6 |
| Nova Scotia.....          | 4,909               | 200.7 | 5,083 | 208.0 | 4,962 | 195.5 |
| Ontario.....              | 6,294               | 217.4 | 6,061 | 212.3 | 6,725 | 243.0 |
| Prince Edward Island..... | 5,235               | 198.8 | 5,616 | 214.1 | 6,586 | 243.4 |
| Quebec.....               | 4,472               | 172.9 | 4,856 | 188.0 | 4,798 | 182.8 |
| Saskatchewan.....         | 4,392               | 169.2 | 4,818 | 190.1 | 4,944 | 192.9 |
| General averages.....     | 5,285               | 195.5 | 5,417 | 200.7 | 5,522 | 207.9 |

The test in 1915 was 3.69 while in 1919 it was 3.7 a very slight increase.

This table shows that from one year to another, there is a gradual increase in the production of the cows recorded. Quite a few of the herds are the same for a number of years, but there are also a great many new herds and after a few years the cows will be practically all different. This means an increase in production from one generation to another and is due to better breeding and feeding.

If these figures can be taken as an indication that the production of the dairy cow is being increased from one year to another, and I think they can, it means that the value of dairy products is being added to yearly to quite an appreciable extent. For example: if every one of the 3,500,000 dairy cows in Canada had given 237 pounds more milk in 1919 than in 1915, the increase in milk production would have been over 829 million pounds, valued at over 21 million dollars.

The consistent use of the scales and Babcock test to get accurate knowledge of the production of each cow, and then a wise use of this knowledge to weed out the poorer animals and to use better feeding methods, will surely pay real money by the increased production of the herd.

TABLE No. V.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN BRITISH COLUMBIA.

| District.                                    | Testing Centre. | Number of Herds. | Number of Cows. | Average Production |       |       |
|----------------------------------------------|-----------------|------------------|-----------------|--------------------|-------|-------|
|                                              |                 |                  |                 | Milk.              | Test. | Fat.  |
|                                              |                 |                  |                 | Lb.                |       | Lb.   |
| Kootenay.....                                | Nakusp.....     | 4                | 11              | 7,485              | 3.9   | 297.8 |
| Kootenay.....                                | Salmon Arm..... | 3                | 23              | 6,224              | 4.0   | 251.3 |
| Yale-Caribou.....                            | Kelowna.....    | 2                | 6               | 5,173              | 3.0   | 261.4 |
| Nanaimo.....                                 | Ganges.....     | 3                | 14              | 5,354              | 4.4   | 254.6 |
| Totals and general average for province..... |                 | 12               | 54              | 6,069              | 3.9   | 262.8 |

TABLE No. VI.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN ALBERTA.

| District.                                    | Testing Centre. | Number of Herds. | Number of Cows. | Average Production. |       |       |
|----------------------------------------------|-----------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                 |                  |                 | Milk.               | Test. | Fat.  |
|                                              |                 |                  |                 | Lb.                 |       | Lb.   |
| Strathcona.....                              | Leduc.....      | 2                | 6               | 2,909               | 3.7   | 113.8 |
| Medicine Hat.....                            | Calendula.....  | 2                | 7               | 5,469               | 3.8   | 207.1 |
| Red Deer.....                                | Red Deer.....   | 1                | 7               | 3,604               | 4.1   | 149.0 |
| Medicine Hat.....                            | Lethbridge..... | 2                | 18              | 6,129               | 3.3   | 204.8 |
| Red Deer.....                                | Didsbury.....   | 3                | 26              | 6,227               | 3.7   | 232.7 |
| Red Deer.....                                | Galahad.....    | 1                | 6               | 3,759               | 3.6   | 135.6 |
| Calgary.....                                 | Calgary.....    | 1                | 13              | 4,241               | 3.8   | 162.7 |
| Totals and general average for Province..... |                 | 12               | 83              | 5,198               | 3.6   | 190.7 |

TABLE No. VII.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN SASKATCHEWAN.

| District.                                    | Testing Centre.  | Number of Herds. | Number of Cows. | Average production. |       |       |
|----------------------------------------------|------------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                  |                  |                 | Milk.               | Test. | Fat.  |
|                                              |                  |                  |                 | Lb.                 |       | Lb.   |
| Prince Albert.....                           | Birch Hills..... | 2                | 12              | 3,962               | 3.9   | 157.1 |
| Humboldt.....                                | Humboldt.....    | 2                | 16              | 5,762               | 3.9   | 208.8 |
| Battleford.....                              | Lashburn.....    | 4                | 16              | 4,861               | 4.2   | 203.7 |
| Totals and General Average for Province..... |                  | 8                | 44              | 4,944               | 3.9   | 192.9 |

TABLE NO. VIII.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN MANITOBA.

| District.                                    | Testing Centre.   | Number of Herds. | Number of Cows. | Average Production. |       |       |
|----------------------------------------------|-------------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                   |                  |                 | Milk.               | Test. | Fat.  |
|                                              |                   |                  |                 | Lb.                 |       | Lb.   |
| Provencher.....                              | La Broquerie..... | 1                | 5               | 3,545               | 3.7   | 133.2 |
| ".....                                       | Otterburne.....   | 2                | 19              | 4,658               | 3.7   | 174.6 |
| ".....                                       | St. Boniface..... | 1                | 34              | 4,655               | 3.4   | 158.3 |
| ".....                                       | Groulx.....       | 5                | 29              | 4,982               | 3.4   | 170.1 |
| Marquette.....                               | Russell.....      | 2                | 11              | 8,941               | 3.1   | 283.6 |
| Totals and general average for province..... |                   | 11               | 98              | 5,177               | 3.4   | 183.4 |

TABLE No. IX.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN ONTARIO.

| County.                                      | Testing Centre.     | Number of Herds. | Number of Cows. | Average Production. |       |       |
|----------------------------------------------|---------------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                     |                  |                 | Milk.               | Test. | Fat.  |
|                                              |                     |                  |                 | Lb.                 |       | Lb.   |
| Stormont.....                                | Northfield Sta..... | 4                | 45              | 5,240               | 3.6   | 199.6 |
| Grenville.....                               | Donville.....       | 2                | 24              | 5,154               | 3.4   | 176.6 |
| Elgin.....                                   | Southwood Sta.....  | 2                | 14              | 7,828               | 3.4   | 272.0 |
| Oxford.....                                  | Woodstock.....      | 3                | 37              | 8,046               | 3.3   | 265.3 |
| Northumberland.....                          | Colborne.....       | 6                | 61              | 8,622               | 3.5   | 302.4 |
| Waterloo.....                                | Preston.....        | 1                | 11              | 8,050               | 3.0   | 243.3 |
| Carleton.....                                | Kars.....           | 1                | 6               | 6,833               | 3.2   | 224.8 |
| Grenville.....                               | Prescott.....       | 3                | 39              | 7,859               | 3.1   | 245.2 |
| Dundas.....                                  | Mountain.....       | 1                | 6               | 5,250               | 3.3   | 176.6 |
| Lincoln.....                                 | St. Catharines..... | 2                | 12              | 6,928               | 3.4   | 240.4 |
| Leeds.....                                   | Westport.....       | 2                | 7               | 5,564               | 4.1   | 232.1 |
| Glengarry.....                               | Martintown.....     | 2                | 10              | 4,572               | 3.4   | 155.7 |
| Elgin.....                                   | St. Thomas.....     | 1                | 1               | 4,536               | 3.1   | 142.5 |
| Oxford.....                                  | Tavistock.....      | 1                | 3               | 6,373               | 3.4   | 217.6 |
| Perth.....                                   | Atwood.....         | 3                | 28              | 8,736               | 3.2   | 283.1 |
| Prescott.....                                | Curran.....         | 1                | 12              | 5,017               | 3.6   | 181.9 |
| Huron.....                                   | Auburn.....         | 2                | 12              | 7,269               | 3.3   | 241.0 |
| Kent.....                                    | Blenheim.....       | 1                | 2               | 6,432               | 3.3   | 218.0 |
| Leeds.....                                   | Mallorytown.....    | 1                | 18              | 4,660               | 4.7   | 219.4 |
| Carleton.....                                | North Gower.....    | 1                | 6               | 6,335               | 3.9   | 247.0 |
| Peterboro.....                               | Peterboro.....      | 1                | 8               | 3,966               | 3.9   | 155.8 |
| Dundas.....                                  | Iroquois.....       | 1                | 24              | 2,735               | 5.3   | 146.9 |
| Prince Edward.....                           | Pictou.....         | 13               | 83              | 6,426               | 4.4   | 285.4 |
| ".....                                       | Bloomfield.....     | 6                | 39              | 7,307               | 3.2   | 239.3 |
| ".....                                       | Rossmore.....       | 2                | 15              | 8,146               | 3.3   | 270.1 |
| ".....                                       | Mountain View.....  | 2                | 12              | 6,220               | 3.3   | 211.0 |
| Totals and general average for province..... |                     | 67               | 535             | 6,725               | 3.6   | 243.0 |

TABLE No. X.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN QUEBEC.

| County.                                      | Testing Centre.              | Number of Herds. | Number of Cows. | Average Production. |       |       |
|----------------------------------------------|------------------------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                              |                  |                 | Milk.               | Test. | Fat.  |
|                                              |                              |                  |                 | Lb.                 |       | Lb.   |
| Richmond.....                                | Melbourne.....               | 1                | 10              | 4,352               | 3.9   | 172.4 |
| Vercheres.....                               | Beloeil.....                 | 1                | 15              | 4,841               | 3.5   | 173.3 |
| Compton.....                                 | Sawyerville.....             | 2                | 19              | 4,508               | 4.0   | 181.7 |
| Montmagny.....                               | Montmagny.....               | 1                | 3               | 4,217               | 3.7   | 158.5 |
| St. Hyacinthe.....                           | St. Hyacinthe.....           | 1                | 6               | 4,148               | 4.0   | 169.4 |
| Pontiac.....                                 | Shawville.....               | 4                | 28              | 4,948               | 3.5   | 176.7 |
| St. Hyacinthe.....                           | St. Thomas D'Aquin.....      | 9                | 64              | 5,264               | 3.6   | 189.7 |
| Charlevoix.....                              | St. Urbain.....              | 1                | 5               | 3,047               | 4.0   | 122.1 |
| Stanstead.....                               | North Hatley.....            | 2                | 18              | 4,765               | 3.5   | 167.9 |
| Portneuf.....                                | St. Raymond.....             | 2                | 7               | 3,657               | 4.1   | 150.8 |
| Rimouski.....                                | Grand Remon.....             | 2                | 17              | 3,954               | 4.1   | 154.4 |
| Stanstead.....                               | Ways Mills.....              | 1                | 7               | 3,118               | 4.8   | 150.7 |
| Lac St. Jean.....                            | Metabetchouan.....           | 23               | 272             | 4,375               | 4.0   | 175.1 |
| Deux Montagnes.....                          | La Trappe.....               | 2                | 59              | 6,004               | 3.7   | 224.9 |
| Montmagny.....                               | Isle Aux Oies.....           | 1                | 18              | 4,125               | 4.2   | 175.1 |
| Stanstead.....                               | Coaticook.....               | 2                | 28              | 4,293               | 3.8   | 166.2 |
| Stanstead.....                               | Hatley.....                  | 1                | 16              | 6,039               | 3.4   | 208.8 |
| Missisquoi.....                              | Cowansville.....             | 1                | 1               | 3,968               | 4.6   | 182.0 |
| Megantic.....                                | Ste. Sophie.....             | 2                | 14              | 5,377               | 3.9   | 213.5 |
| Missisquoi.....                              | N. D. de Stanbridge.....     | 28               | 191             | 5,434               | 3.6   | 199.4 |
| Stanstead.....                               | St. Hermenegelde.....        | 1                | 2               | 5,573               | 4.4   | 248.5 |
| Dorchester.....                              | St. Isidore.....             | 1                | 7               | 2,675               | 4.1   | 109.8 |
| Nicolet.....                                 | St. Pierre les Becquets..... | 5                | 31              | 4,183               | 4.0   | 165.7 |
| Charlevoix.....                              | St. Urbain.....              | 1                | 2               | 5,652               | 4.1   | 231.9 |
| Yamaska.....                                 | La Baie.....                 | 5                | 34              | 4,648               | 3.8   | 176.5 |
| Beauce.....                                  | Jersey Mills.....            | 1                | 4               | 5,033               | 3.4   | 172.3 |
| Missisquoi.....                              | Farnham.....                 | 7                | 70              | 5,004               | 3.5   | 178.7 |
| Missisquoi.....                              | Clarenceville.....           | 2                | 16              | 3,642               | 3.8   | 140.5 |
| Kamouraska.....                              | St. Anne Pocatiere.....      | 5                | 79              | 4,669               | 3.8   | 178.7 |
| Temiscouata.....                             | Trois Pistoles.....          | 1                | 5               | 5,094               | 4.2   | 214.8 |
| Totals and general average for province..... |                              | 116              | 1,048           | 4,798               | 3.8   | 182.8 |

TABLE No. XI.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN NEW BRUNSWICK.

| County.                                      | Testing Centre.        | Number of Herds. | Number of Cows. | Average Production. |       |       |
|----------------------------------------------|------------------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                        |                  |                 | Milk.               | Test. | Fat.  |
|                                              |                        |                  |                 | Lb.                 |       | Lb.   |
| Kent.....                                    | St. Anthony.....       | 2                | 5               | 2,695               | 4.5   | 121.9 |
| Kings.....                                   | Kingston.....          | 2                | 14              | 5,157               | 4.8   | 251.3 |
| Kings.....                                   | Central Greenwich..... | 5                | 21              | 5,130               | 3.9   | 203.5 |
| Kings.....                                   | Hampton Village.....   | 3                | 15              | 3,352               | 4.3   | 143.5 |
| Westmoreland.....                            | Moncton.....           | 1                | 8               | 6,831               | 3.9   | 269.6 |
| Gloucester.....                              | West Bathurst.....     | 12               | 91              | 5,119               | 3.9   | 199.2 |
| Totals and general average for province..... |                        | 25               | 154             | 5,857               | 4.0   | 235.6 |

TABLE No XII.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN NOVA SCOTIA.

| County.                                      | Testing Centre.        | Number of Herds. | Number of Cows. | Average Production. |       |       |
|----------------------------------------------|------------------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                        |                  |                 | Milk.               | Test. | Fat   |
|                                              |                        |                  |                 | Lb.                 |       | Lb.   |
| Colchester.....                              | Great Village.....     | 5                | 23              | 6,101               | 3.5   | 218.4 |
| Cumberland.....                              | Wentworth.....         | 1                | 3               | 2,943               | 4.2   | 124.1 |
| Colchester.....                              | Brookfield.....        | 8                | 51              | 5,479               | 3.8   | 206.4 |
| Annapolis.....                               | Lawrencetown.....      | 2                | 11              | 5,223               | 3.4   | 180.8 |
| Pictou.....                                  | Stellarton.....        | 5                | 24              | 4,937               | 4.5   | 220.3 |
| Antigonishe.....                             | Lower South River..... | 6                | 26              | 5,447               | 3.5   | 195.6 |
| Antigonishe.....                             | Antigonishe.....       | 6                | 32              | 5,657               | 3.8   | 214.8 |
| Inverness.....                               | Margaree Forks.....    | 1                | 12              | 4,098               | 3.9   | 162.7 |
| Halifax.....                                 | Windsor Junction.....  | 1                | 6               | 5,156               | 3.6   | 189.9 |
| Pictou.....                                  | River John.....        | 9                | 24              | 3,737               | 4.3   | 162.3 |
| Pictou.....                                  | Scotsburn.....         | 9                | 63              | 4,877               | 4.3   | 210.4 |
| Colchester.....                              | Earltown.....          | 6                | 27              | 3,902               | 3.9   | 158.4 |
| Hants.....                                   | Stirling Brook.....    | 9                | 34              | 5,149               | 3.7   | 193.8 |
| Cumberland.....                              | Amherst.....           | 3                | 9               | 4,306               | 4.0   | 176.4 |
| Cumberland.....                              | River Herbert.....     | 1                | 8               | 3,442               | 3.5   | 122.7 |
| Cumberland.....                              | Shinimicas.....        | 4                | 27              | 5,600               | 3.6   | 204.4 |
| Yamouth.....                                 | Pembroke Shore.....    | 3                | 11              | 4,487               | 4.8   | 217.9 |
| Victoria.....                                | Baddeck Bridge.....    | 1                | 7               | 2,794               | 3.7   | 103.8 |
| Lunenburg.....                               | Barrs' Corners.....    | 3                | 9               | 5,172               | 4.3   | 224.5 |
| Totals and general average for province..... |                        | 83               | 416             | 4,962               | 3.9   | 195.5 |

TABLE No. XIII.

AVERAGE PRODUCTION OF COWS RECORDED FOR THE FULL PERIOD OF LACTATION IN EACH TESTING CENTRE IN PRINCE EDWARD ISLAND.

| County.                                      | Testing Centre.      | Number of Herds. | Number of Cows. | Average Production. |       |       |
|----------------------------------------------|----------------------|------------------|-----------------|---------------------|-------|-------|
|                                              |                      |                  |                 | Milk.               | Test. | Fat.  |
|                                              |                      |                  |                 | Lb.                 |       | Lb.   |
| Kings.....                                   | Montague.....        | 4                | 14              | 4,876               | 3.6   | 176.9 |
| Prince.....                                  | Central Bedeque..... | 1                | 7               | 4,092               | 4.4   | 180.2 |
| Prince.....                                  | North Tryon.....     | 15               | 85              | 7,326               | 3.3   | 247.7 |
| Queens.....                                  | Crapaud.....         | 11               | 46              | 7,727               | 3.5   | 274.6 |
| Queens.....                                  | Stanley Bridge.....  | 1                | 4               | 7,244               | 3.4   | 247.2 |
| Queens.....                                  | New Glasgow.....     | 2                | 8               | 7,238               | 3.3   | 241.5 |
| Queens.....                                  | Milton.....          | 29               | 136             | 5,985               | 4.0   | 239.9 |
| Totals and general average for province..... |                      | 63               | 300             | 6,586               | 3.7   | 243.4 |

A study of the preceding tables will show what a great difference there is in the average production of the cows in different districts, e.g., 45 cows at Northfield Station averaged 5,420 pounds milk and 199.6 pounds fat, while 37 cows at Woodstock averaged 8,046 pounds milk and 265.3 pounds fat, a difference of 2,626 pounds milk per cow.

But it is when the totals of the milk produced are compared that real differences become evident, which might not be so noticeable when comparing averages. The 37 cows at Woodstock produced 53,803 pounds more milk than the 45 cows at Northfield Station.

Or if the 24 cows at Domville centre had averaged as much as the 61 cows at Colborne they would have produced 3,006.2 pounds more fat than they did.

These instances can be multiplied many times from the other provinces where cow testing centres are established.

The following two tables will show what some of the best cows and best herds have produced during the past year:—

TABLE No. XIV.

PRODUCTION OF A FEW OF THE BEST HERDS RECORDED, 1919.

| Province and Association.     | Number<br>Cows. | Average Production. |       |       |
|-------------------------------|-----------------|---------------------|-------|-------|
|                               |                 | Milk.               | Test. | Fat.  |
| <i>Alberta—</i>               |                 | Lb.                 |       | Lb.   |
| Didsbury.....                 | 16              | 7,201               | 3.8   | 275.2 |
| Sibbald.....                  | 4               | 6,121               | 3.9   | 241.3 |
| <i>British Columbia—</i>      |                 |                     |       |       |
| Nakusp.....                   | 2               | 9,666               | 3.5   | 344.8 |
| Canoe.....                    | 8               | 6,817               | 4.5   | 321.3 |
| Salmon Arm.....               | 3               | 8,155               | 4.1   | 335.8 |
| <i>Manitoba—</i>              |                 |                     |       |       |
| Russell.....                  | 8               | 10,227              | 3.2   | 324.1 |
| <i>New Brunswick—</i>         |                 |                     |       |       |
| Hanesville.....               | 8               | 6,831               | 3.9   | 269.6 |
| Central Greenwich.....        | 6               | 6,055               | 4.1   | 247.0 |
| Kingston.....                 | 7               | 6,117               | 4.5   | 283.0 |
| <i>Nova Scotia—</i>           |                 |                     |       |       |
| Brookfield.....               | 13              | 6,513               | 3.7   | 244.7 |
| Brookfield.....               | 3               | 7,760               | 4.3   | 332.7 |
| Lower South River.....        | 6               | 7,153               | 3.6   | 262.7 |
| Scotsburn.....                | 6               | 6,287               | 4.7   | 297.1 |
| <i>Ontario—</i>               |                 |                     |       |       |
| Colborne.....                 | 14              | 9,871               | 3.4   | 353.0 |
| Colborne.....                 | 10              | 9,696               | 3.6   | 358.4 |
| Listowel.....                 | 13              | 9,787               | 3.0   | 301.9 |
| Atwood.....                   | 7               | 9,961               | 2.9   | 255.2 |
| Woodstock.....                | 20              | 8,421               | 3.2   | 277.1 |
| Woodstock.....                | 12              | 8,559               | 3.1   | 272.8 |
| <i>Prince Edward Island—</i>  |                 |                     |       |       |
| Victoria.....                 | 10              | 9,684               | 3.3   | 325.3 |
| Tryon.....                    | 3               | 8,428               | 3.9   | 333.4 |
| Milton.....                   | 4               | 8,696               | 3.9   | 341.1 |
| Milton.....                   | 2               | 11,366              | 3.6   | 409.6 |
| Milton.....                   | 6               | 6,567               | 4.4   | 294.0 |
| <i>Quebec—</i>                |                 |                     |       |       |
| St. Thomas d'Aquin.....       | 5               | 6,045               | 3.9   | 236.0 |
| La Trappe.....                | 44              | 6,682               | 3.8   | 254.2 |
| Notre Dame de Stanbridge..... | 8               | 5,004               | 5.9   | 296.9 |
| Notre Dame de Stanbridge..... | 3               | 6,778               | 3.6   | 246.3 |
| La Trappe.....                | 15              | 6,004               | 3.4   | 224.9 |
| <i>Saskatchewan—</i>          |                 |                     |       |       |
| Lashburn.....                 | 2               | 5,749               | 4.7   | 251.7 |

The herd averages instanced in the table above show what can be accomplished by progressive dairymen in building up a good herd when aided by individual records of each cow. These herd records should be an incentive to other farmers to keep dairy records and to use them as a guide in herd improvement.

TABLE No. XV.

PRODUCTION OF A FEW OF THE BEST INDIVIDUAL COWS RECORDED IN 1919.

| Province and Association.    | Age of Cow. | Number Months Milking. | Total Production. |       |       |
|------------------------------|-------------|------------------------|-------------------|-------|-------|
|                              |             |                        | Milk.             | Test. | Fat.  |
| <i>Alberta—</i>              |             |                        | Lb.               |       | Lb.   |
| Didsbury.....                |             | 12                     | 9,890             | 3.70  | 365.3 |
| Didsbury.....                | 7           | 11                     | 8,048             | 4.81  | 387.3 |
| Didsbury.....                | 4           | 12                     | 8,711             | 3.78  | 329.6 |
| <i>British Columbia—</i>     |             |                        |                   |       |       |
| Nakusp.....                  | 8           | 11                     | 11,515            | 4.43  | 510.9 |
| Salmon Arm.....              | 7           | 11                     | 10,449            | 4.05  | 429.6 |
| Canoe.....                   |             | 10                     | 9,640             | 4.39  | 423.8 |
| <i>Manitoba—</i>             |             |                        |                   |       |       |
| Russell.....                 | 3           | 10                     | 12,342            | 3.51  | 432.7 |
| Russell.....                 | 3           | 10                     | 14,399            | 2.90  | 415.4 |
| Russell.....                 | 3           | 12                     | 11,825            | 3.26  | 384.8 |
| <i>New Brunswick—</i>        |             |                        |                   |       |       |
| Hanerville.....              |             | 12                     | 9,660             | 3.68  | 355.8 |
| Hanerville.....              |             | 12                     | 8,294             | 4.20  | 348.1 |
| Kingston.....                | 7           | 9                      | 7,624             | 4.41  | 336.7 |
| Kingston.....                | 4           | 11                     | 7,755             | 4.53  | 351.3 |
| Kingston.....                | 5           | 12                     | 7,270             | 4.70  | 341.9 |
| <i>Nova Scotia—</i>          |             |                        |                   |       |       |
| Alma.....                    | 8           | 9                      | 6,804             | 4.45  | 303.1 |
| Scotsburn.....               |             | 10                     | 8,065             | 5.56  | 448.7 |
| Scotsburn.....               |             | 11                     | 9,060             | 3.91  | 354.7 |
| Scotsburn.....               | 8           | 11                     | 8,090             | 4.43  | 359.0 |
| Williams Point.....          | 10          | 11                     | 9,665             | 3.86  | 373.2 |
| Lower South River.....       |             | 10                     | 10,060            | 3.71  | 371.5 |
| <i>Ontario—</i>              |             |                        |                   |       |       |
| Northfield Station.....      | 6           | 10                     | 12,086            | 3.38  | 409.3 |
| Southwold Station.....       | 7           | 10                     | 10,710            | 3.08  | 330.8 |
| Southwold Station.....       | 6           | 12                     | 10,040            | 3.80  | 385.0 |
| Woodstock.....               |             | 11                     | 11,558            | 3.02  | 347.9 |
| Woodstock.....               |             | 11                     | 12,442            | 3.40  | 422.8 |
| Woodstock.....               | 7           | 8                      | 11,399            | 3.48  | 393.5 |
| Colborne.....                |             | 9                      | 13,152            | 3.12  | 409.7 |
| Colborne.....                | 12          | 12                     | 12,270            | 3.37  | 411.4 |
| Colborne.....                |             | 12                     | 12,440            | 3.49  | 433.6 |
| Colborne.....                |             | 12                     | 13,358            | 3.56  | 474.4 |
| Colborne.....                | 8           | 11                     | 12,718            | 3.74  | 475.4 |
| Colborne.....                | 9           | 12                     | 12,032            | 3.97  | 476.9 |
| <i>Prince Edward Island—</i> |             |                        |                   |       |       |
| Bedeque.....                 |             | 12                     | 10,950            | 4.77  | 520.5 |
| Bedeque.....                 | 7           | 11                     | 9,170             | 4.11  | 377.3 |
| Southport.....               | 3           | 8                      | 10,801            | 3.90  | 422.9 |
| Marshfield.....              | 4           | 10                     | 14,260            | 3.51  | 509.1 |
| Victoria.....                | 2           | 12                     | 13,036            | 3.29  | 428.6 |
| Victoria.....                | 9           | 12                     | 11,987            | 3.27  | 389.8 |
| Winsloe.....                 |             | 7                      | 7,880             | 4.97  | 390.9 |
| <i>Quebec—</i>               |             |                        |                   |       |       |
| St. Sophie.....              | 5           | 10                     | 7,161             | 5.54  | 397.2 |
| La Trappe.....               | 6           | 11                     | 9,027             | 3.83  | 356.0 |
| La Trappe.....               | 11          | 10                     | 9,470             | 3.73  | 355.1 |
| La Trappe.....               |             | 11                     | 9,694             | 3.95  | 363.7 |
| Farnham.....                 |             | 11                     | 9,250             | 3.55  | 328.4 |

Individual records of 14,399 pounds milk and 415.4 pounds fat; 11,515 pounds milk and 510.9 pounds fat, and others mentioned in the preceding table are great tributes to the men handling grade herds and show what can be done when proper breeding and feeding methods are used.

Since the new plan of cow testing has been in practice, it has been impossible to obtain feed accounts of different herds. Therefore, there are no tables compiled giving actual figures of feed costs for different herds or showing profits above the cost of feed made by individual cows.

However, the following tables will plainly show how much more economical are the cows which give large yields of milk and fat compared with the cows which are small producers:—

TABLE No. XVI.

CONTRASTS BETWEEN FOUR OF THE BEST AND FOUR OF THE POORER HERDS RECORDED IN ONTARIO.

## FOUR BEST HERDS.

| Herd Number.           | Number Cows. | Milk per Cow. | Fat per Cow. | Returns per Cow at \$2.49 per 100 lb. | Estimated Average cost of feed per Cow. | Profit per cow above Feed Cost. |
|------------------------|--------------|---------------|--------------|---------------------------------------|-----------------------------------------|---------------------------------|
|                        |              | Lb.           | Lb.          | \$ cts.                               | \$ cts.                                 | \$ cts.                         |
| A.....                 | 14           | 9,871         | 353.0        | 245.78                                | 86.00                                   | 159.78                          |
| B.....                 | 10           | 9,696         | 358.4        | 241.43                                | 86.00                                   | 155.43                          |
| C.....                 | 7            | 9,961         | 295.2        | 248.02                                | 86.00                                   | 162.02                          |
| D.....                 | 13           | 9,787         | 301.9        | 243.69                                | 86.00                                   | 157.69                          |
| Total and average..... | 44           | 9,821         | 329.9        | 244.53                                | 86.00                                   | 158.53                          |

## FOUR POORER HERDS.

|                        |    |       |       |        |       |       |
|------------------------|----|-------|-------|--------|-------|-------|
| A.....                 | 9  | 4,090 | 150.1 | 101.84 | 71.00 | 30.84 |
| B.....                 | 15 | 4,931 | 177.9 | 122.78 | 71.00 | 51.78 |
| C.....                 | 9  | 5,526 | 174.4 | 137.59 | 71.00 | 66.59 |
| D.....                 | 8  | 5,060 | 189.1 | 125.99 | 71.00 | 54.99 |
| Total and average..... | 41 | 4,902 | 173.1 | 122.06 | 71.00 | 51.06 |

NOTE.—The price per 100 pounds milk was the average price paid during 1919 by Government Dairy Station at Finch. The feed costs are only estimated costs and may be somewhat low.

The above table will show, comparatively, why it pays to keep the high producers. The 44 cows in the best herds produced more than twice as much milk and fat as 41 cows in the four poorer herds. The farmer keeping poor cows wastes a lot of good feed and energy every year caring for them.

The difference between the average production of the best herd and that of the poorest is 5,781 pounds milk and 202.9 pounds fat. These figures go to show that there is room for vast improvement in the matter of increased production of milk and fat.

TABLE No. XVII.

CONTRASTS IN PRODUCTION BETWEEN THE BEST AND POOREST COWS IN A FEW OF THE HERDS RECORDED IN 1919.

| Herd Number.     | Yield of Milk per Cow. | Yield of Fat per Cow. | Return per Cow \$2.49 per 100 lb. |
|------------------|------------------------|-----------------------|-----------------------------------|
| 1. Best Cow..... | 12,086                 | 409.3                 | \$300.94                          |
| Poorest Cow..... | 3,059                  | 130.4                 | 76.16                             |
| 2. Best Cow..... | 10,710                 | 330.8                 | 266.67                            |
| Poorest Cow..... | 5,052                  | 166.5                 | 125.79                            |
| 3. Best Cow..... | 12,442                 | 422.8                 | 309.80                            |
| Poorest Cow..... | 5,370                  | 172.3                 | 133.71                            |

This table will show plainly the difference in the earning power between cows in the same herd. When it is considered that it costs nearly as much to feed the poorer cow as it does for the high producer, one can readily see which cow is the one to keep on the farm and from which to raise calves for the future herd.

If the exact cost of feed were known and subtracted from the value of the milk, the profit above cost of feed for the best cow in any one of these herds would be many times that of the poorest cow.

For example, in herd No. 1, if it cost \$120 to feed the best cow, the profit above cost of feed would be \$180.94, and if it cost \$70 to feed the poorest cow, the profit above cost of feed would be \$6.16. Thus the best cow would make over twenty-nine times as much profit over cost of feed as the poorest cow, or in other words, it would take twenty-nine cows like the poor one to make as much profit above cost of feed as the best cow.

Using the same calculated feed costs, the best cow would produce 100 pounds milk for 99 cents, while the poorest cow would not produce 100 pounds milk for less than \$2.29. This means that it costs the farmer \$1.30 more to produce 100 pounds milk from the poor cow than it did from the good one, notwithstanding the fact that the feed costs for the good cow were nearly double those for the poor one.

High producers will lessen the cost of production considerably.

These facts are made known by keeping a record of each cow in the herd for the full lactation period.

TABLE No. XVIII.

INCREASES IN PRODUCTION OF MILK AND FAT MADE BY HERDS WHICH HAVE BEEN RECORDED.

| Herd Number. | 1918.           |                     |       | 1919.           |                     |       | Increase per Cow. |      |
|--------------|-----------------|---------------------|-------|-----------------|---------------------|-------|-------------------|------|
|              | Number of Cows. | Average Production. |       | Number of Cows. | Average Production. |       | Milk.             | Fat. |
|              |                 | Milk.               | Fat.  |                 | Milk.               | Fat.  |                   |      |
|              |                 | Lb.                 | Lb.   |                 | Lb.                 | Lb.   | Lb.               | Lb.  |
| 1.....       | 38              | 5,962               | 219.3 | 44              | 6,682               | 254.2 | 720               | 34.9 |
| 2.....       | 10              | 4,146               | 165.5 | 12              | 5,173               | 211.6 | 1,027             | 46.1 |
| 3.....       | 10              | 3,565               | 125.5 | 9               | 4,893               | 163.0 | 1,328             | 37.5 |
| 4.....       | 13              | 3,800               | 139.3 | 15              | 4,922               | 170.1 | 1,122             | 30.8 |
| 5.....       | 21              | 4,132               | 159.1 | 21              | 5,484               | 201.1 | 1,352             | 42.0 |

| Herd Number. | 1915.           |              | 1919.           |              | Increase in fat per Cow. |
|--------------|-----------------|--------------|-----------------|--------------|--------------------------|
|              | Number of Cows. | Fat per Cow. | Number of Cows. | Fat per Cow. |                          |
|              |                 |              |                 |              |                          |
|              |                 | Lb.          |                 | Lb.          | Lb.                      |
| 1.....       | 9               | 215.0        | 7               | 258.0        | 43.0                     |
| 2.....       | 10              | 159.4        | 10              | 219.2        | 56.8                     |
| 3.....       | 6               | 96.5         | 7               | 167.9        | 71.4                     |
| 4.....       | 5               | 197.9        | 5               | 213.1        | 15.2                     |
| 5.....       | 6               | 138.3        | 6               | 188.8        | 50.5                     |
| 6.....       | 7               | 323.8        | 8               | 344.3        | 20.5                     |

These figures show what has been accomplished in a very short time by careful study of herd records. Such marked increases are quite common wherever cow testing is followed consistently with the intention of herd improvement.

In a creamery at Tryon, Prince Edward Island, thirteen patrons who have kept records for a number of years have all made increases ranging from 4 to 74 per cent in the average butter fat production per cow. The average increase per cow in these herds from 1915 to 1919 was 33.1 pounds fat, or the increased returns from each cow would be about \$20 at prevailing prices for fat.

The Supervisor in Nova Scotia reports that the patrons of factories who were cow testing produced about 80 per cent more fat than patrons who never kept records of individual cows.

Cow testing has proved itself many times to be a sound business policy for any dairyman to adopt. But it will test the man as well as the cows. Those who are fully aware of the possibilities for improvement will use the records of their herds as a basis of selection for the good cows and help weed out the poor cows. But there are some who will make no improvement in their herds, because they do not use the information which has been given them by cow testing.

Keep records of each cow and then make the best possible use of them to improve the production of the herd by better breeding and better feeding and by weeding out the poor cow.

### IN CONCLUSION.

Mention should be made of the hearty co-operation on the part of the provincial authorities in promoting cow testing throughout Canada.

In the province of Quebec the Minister of Agriculture directed that the whole staff of dairy instructors should devote one month during the beginning of the season of 1920 in an effort to bring the work to the attention of a larger number of farmers, and to induce them as far as possible to take up the keeping of records. The results were very gratifying and there will be a very large increase in the number of cows tested in the province during the coming season.

In Manitoba an effort is being made on the part of the Agricultural Extension Service to interest the boys and girls who are members of the Boys' and Girls' Clubs. There is full co-operation between the officials who have this matter in hand and the Dominion Dairy Promoter for the province.

Prizes are being offered for milk production in Prince Edward Island, and the Department of Education in Nova Scotia is taking a very keen interest and has been very helpful in promoting the work by interesting the school teachers. The Royal Bank of Canada in Nova Scotia has also helped by putting up placards at its various branches, calling attention to the usefulness of cow testing.

Although cow testing has been carried on in Canada under federal auspices, there is a good deal to be said in favour of the view that it is more properly a provincial function. At the conference of provincial Deputy Ministers of Agriculture held at Ottawa March 17 to 19, 1920, the Dairy Commissioner, with the authority of the Minister, announced that whenever any of the provinces were ready to take over this work that the Dominion Department would be glad to transfer it to the Provincial Department of Agriculture.

## OTHER PUBLICATIONS OF THE DAIRY BRANCH RELATING TO DAIRYING.

### BULLETINS.

| Date issued. | No. | Title.                                                                                                                                                                                                                              |
|--------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1909         | *22 | The Cooling of Milk for Cheesemaking.                                                                                                                                                                                               |
| 1910         | 27  | Coulommier Cheese, Some Notes on its Manufacture.                                                                                                                                                                                   |
| 1911         | 28  | The Dairying Industry, and Historical and Descriptive Account.                                                                                                                                                                      |
| 1911         | 30  | Cream Cheese. (Second Edition.)                                                                                                                                                                                                     |
| 1913         | 37  | The Island of Orleans Cheese.                                                                                                                                                                                                       |
| 1914         | 41  | Cheese Factory and Creamery Plans.                                                                                                                                                                                                  |
| 1915         | 45  | The Testing of Milk, Cream and Dairy Products by Means of the Babcock Test.                                                                                                                                                         |
| 1915         | 46  | Determination of the Specific Gravity of Milk; the Percentage of Acid and Casein in Milk; the Adulteration of Milk by Skimming and Watering; the Percentage of Water and Salt in Butter; the Percentage of Fat and Water in Cheese. |
| 1917         | 49  | Small Cold Storages and Dairy Buildings.                                                                                                                                                                                            |
| 1917         | 53  | Buttermaking on the Farm.                                                                                                                                                                                                           |
| 1918         | 54  | List of Cheese Factories, Creameries, Skimming Stations, also Condensed Milk Manufacturers, City Milk Vendors and Ice Cream Manufacturers, etc., in Canada.                                                                         |
| 1920         | 55  | The Finch Dairy Station, Report of Progress.                                                                                                                                                                                        |
| 1920         | 56  | Report of the Dominion Educational Butter Scoring Contest, 1919.                                                                                                                                                                    |
| 1920         | *57 | Simple Methods for the Storage of Ice.                                                                                                                                                                                              |

### CIRCULARS.

|      |     |                                                                                                   |
|------|-----|---------------------------------------------------------------------------------------------------|
| 1914 | 10  | Notes on Cow Testing.                                                                             |
| 1914 | 12  | The Branding of Dairy Butter.                                                                     |
| 1915 | *14 | Causes of Variation in the Percentage of Fat in Hand Separator Cream.                             |
| 1916 | 18  | The Use of Pepsin as a Substitute or partial Substitute for Rennet in the Manufacture of Cheese.  |
| 1916 | 19  | Directions for Using Soluble Powdered Pepsin as a Substitute for Rennet.                          |
| 1917 | 21  | Further Notes on the Use of Pepsin and Other Substitutes for Rennet in the Manufacture of Cheese. |
| 1917 | 22  | The Manufacture of Cottage and Buttermilk Cheese.                                                 |
| 1917 | 23  | The Manufacture of Buttermilk from Skimmed Milk.                                                  |
| 1918 | *25 | Keeping Dairy Records.                                                                            |
| 1919 | *26 | The Care of Cream for Buttermaking                                                                |
| 1919 | 27  | Yield and Relative Value of Some Dairy Products.                                                  |
| 1920 | 28  | Dairy Industry Act, 1914, and Regulations.                                                        |

### SPECIAL PUBLICATIONS.

|      |                                                                                             |
|------|---------------------------------------------------------------------------------------------|
| 1907 | Map Showing the Location of Cheese Factories and Creameries in Canada.                      |
| 1911 | Report of the Third Dominion Conference of Dairy Experts, December 6 and 7, 1911.           |
| 1918 | Report of the Proceedings of a Dominion Dairy Conference, November 25, 26, 27 and 28, 1918. |

Any of these publications will be sent free of charge on application to the Dairy and Cold Storage Commissioner, or to the Publications Branch, Department of Agriculture, Ottawa, Ont.

\*A sufficient number of bulletins 22 and 57, and circulars 14, 25 and 26 will be sent to the manager of any cheese factory or creamery to supply each patron with one.